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Editorial.

THE VETERINARIAN AND THE PUBLIC.

It is not the stock-owner only who should appreciate the services of the veterinarian, but the public also is indirectly benefited by his activities and gathers some advantages from him. When all civilians owe a present debt to our soldiers, it is certain that a fair proportion of obligation and gratitude is due from the proletariat to the members of the Army Veterinary Corps. The preservation of the health of animal life is of economic value to the people, and the restoration to health or usefulness of sick, lame, or injured horses has its good effect on the trade and transport of a community. With many equines incapacitated or unworkable in a town or city serious results accrue to those who depend on the removal of goods to keep their businesses going, on transport for a living, on the reception of supply for life. The suppression of glanders and tuberculosis is work directed against a menace to the public from two dire diseases.

From a sentimental and humanitarian point of view, which will especially appeal to the women of the nation, it is well that the lives of dogs and cats be rendered as happy, useful, and complete as possible, and much depends on the veterinarian in this connection. One or two canine and feline diseases are communicable from animals to man, and by reason of the usual intimate contact between subject and owner there is real danger of communication and spread of the maladies. The veterinary surgeon can explain the matter and lessen the danger of infection.

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The published reports from towns and cities where meat and milk inspection are carried out show what service is rendered in safeguarding the health of the adults and children of the region, and give some idea of how much more could be done for human welfare if these two operations were by any means universally adopted. A good and wholesome food supply and a hygienic production and distribution of meat and milk are things to which humanity is entitled in civilized countries. The work in connection with the supervision of these proceedings is essentially one for the veterinarian, and as education and enlightenment spread the public demand for official veterinary surgeons is likely to increase. Not that we are in favour of wholesale officialism, for we remember that the last letter we ever had from an ordinary practitioner in Germany (the land of officialism) concluded thus: "May God in His infinite mercy preserve you from the type of man corresponding to the official German veterinary surgeon." Nevertheless, a due proportion of officialism in veterinary matters is beneficial. In our private capacity as ordinary practitioners we can do much good in giving salutary hints on hygienic procedure and warnings as to the danger of consumption of, or contact with diseased flesh or tainted or damaged nutriment. To show in a slight degree how serviceable we may be to the public and how knowledgeable we ought to be, we have known veterinary surgeons to be consulted without fee or reward as to the wholesomeness of a duck for the family dinner on Sunday, the goodness of fish for breakfast, the propriety of certain sausages as food, and the soundness of a flitch of home-cured bacon. The public in these isolated cases appealed to the man it thought ought to know, and something may be said in favour of its discernment, for who ought to have better knowledge of these things than the veterinarian?

The benefit to the general public of the control by the State, working through its veterinary surgeons, of the chief infectious diseases of animals cannot be over-estimated. Foot-and-mouth disease, anthrax, swine fever, and tuberculosis are controlled almost as much in the interest of the public as in that of the stock-owner. The study of animal diseases is necessary to work out methods of control. A more extended and better fostered encouragement of research and a liberal endowment of veterinary schools are both operations tending to

benefit the people. The Board of Agriculture research workers have already done good service. The use of abortin promises well, the employment of swine fever serum is destined to check the ravages of the plague, and thus save many pigs to increase the nation's food supply. The losses from Johne's disease will decrease as knowledge of its symptoms, methods of spread, and how to deal with it become more universally grasped. As other fields of inquiry into disease open out the control net will probably be cast wider, and further maladies causing loss of food supply or defective victuals will be caught within its meshes.

Having reviewed some of our services to the community, we wish it could be written that we are always treated as we deserve. In too many cases, both in private practice and in public work, we are looked upon as tradesmen or uneducated men beyond the pale of the intellectual and cultured classes. Too often we have to treat with principals through the medium of stablemen, underlings, and general factotums. The right impression and knowledge of us is too seldom acquired directly by the men who employ us. An unscrupulous and ignorant time-server who has not got his palm self-sufficiently oiled frequently has the power to carry a distorted view of us and our procedure to his complacent master. Occasionally the latter might be agreeably surprised if he got in touch with us oftener and took more interest in his stable. Like the man whose first acquaintance with the parson of his district was made on his deathbed, he might say: "I never knew there was such a worthy man among us, otherwise I would have conferred with him oftener." Public bodies, politicians, and the State do not always give the veterinarian the remuneration and credit that he is entitled to. In many cases it is due to faulty or false ideas and knowledge of his worth, work, and influence. G. M.

A STATE-OWNED STUD.

The liberal and patriotic offer of Colonel Hall Walker to the nation has been accepted after some hesitation. A fine collection of bloodstock has come into possession of the Government as a gift. It would have been a lamentable mistake if the chance had been missed.

The time could not be more opportune, and such a favour is,

we believe, unique in the history of any country. Various foreign Governments have possessed their State studs for some years, but they have been acquired after much expenditure of time and money, and have never been obtained free of charge. When State studs are properly managed they are of inestimable value. They furnish a nucleus for the all-round improvement of equine stock. Scientific information on breeding matters that can hardly be obtained otherwise may be gained from their reports. Statistics of great service to the science of zootechny may be collected and tabulated from the results of the operations carried out in their management. They may point the right way to get the best results in horse-breeding. They improve stock and tend to limit the production of worthless animals. Many advanced countries have several State studs, and we know what some of them have done in the matter of horse-breeding.

Besides a good supply of stallions, however, we want an increased number of first-class brood mares. This is the matter now that needs the closest attention and speeding up. The produce of a stud needs to be kept in the country, and protective measures adopted towards it. Austria-Hungary gave £170,000 for the Kisber stud, bought from the Batthyani family, but the progeny of the stock are only sold subject to the following conditions: "No foreigner can buy at all. The buyer is, moreover, bound never to start a horse so bought in any selling race, never to sell it to a foreigner, nor to allow its produce to leave the country."

It is said that we have spent over £12,000,000 in one foreign country alone in buying horses for our Army since the beginning of the War. When are we going to conduct things on right lines and give some of our own countrymen the benefit of such sums of money? We want more State studs, and Colonel Hall Walker has set a noble example to the Empire, and deserves the heartiest thanks and gratitude of all well-wishers of our country, and of all those interested in the welfare and advance of light horse breeding. G. M.

General Articles.

REPORT ON THE USE OF A HYPERTONIC SOLUTION OF COMMON SALT IN VETERINARY PRACTICE IN THE FIELD.

By J. R. GREIG.

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Some weeks ago I received a copy of a memorandum describing the method of "lymph lavage" and the use of a hypertonic solution of common salt in the treatment of the bacterial infections of wounds.

I have carried out treatment on the lines laid down therein, and have the honour to submit the following report on my experience in the use of this method.

A clean-cut aseptic wound is rarely met with in the field, and as it is practically impossible to presume such in a condition of asepsis, I had hitherto made it my practice to employ an antiseptic in the treatment of this as of all conditions of wounds, but in these cases in which the method of "lymph lavage" has been adopted I have completely dispensed with the use of antiseptic lotions and dressings, although at the same time disinfectants have been freely employed with a view to obviating the chance infection of one wound from another through the medium of contaminated instruments, &c.

The treatment, which was at first carried out on experimental lines, has been applied to all classes of wounds, from simple abrasions to serious cases associated with bacterial infections of suppurative and gangrenous character, and I have been so satisfied with the results that I have adopted it as general routine practice.

The method is carried out as follows:—

The salt solution is employed in strengths varying from 2½ to 10 per cent., depending on the amount of bacterial infection. The wound is first of all swabbed out by means of a clean piece of cotton-wool, and all purulent discharges and extraneous matter, &c., removed. The application of the hypertonic solution is then made by means of an ordinary wound syringe, and should be repeated every four or five hours for the first two days. In those cases in which it is practicable, each application may be followed

by lightly bandaging a pad of cotton-wool saturated with the solution over the wound surface; where this is done, however, one should be careful that the natural drainage is not hindered.

The provision of adequate drainage is a "*sine quâ non*," as the rationale of the treatment depends on a continuous free flushing of the wound surface by lymph. To ensure free discharge the wound may, if necessary, be laid open, and where practicable dependent drainage openings provided.

The increased lymph production induced by the hypertonic solution evidences itself soon after the commencement of treatment, and in from twenty-four to thirty-six hours it assumes the form of a more or less copious discharge, which continues for a period varying from forty-eight hours to four days. In the case of suppurating wounds the discharge is at first thick and purulent.

This "primary discharge" gradually gives place to a "secondary discharge," which is thinner and more translucent in character, and which, apparently, consists of lymph of high phagocytic activity.

The "primary discharge" appears to act principally as a cleansing agent. As it is "drawn into the wound" it washes with it pus and necrotic matter resulting from the suppurative and gangrenous processes, and these in turn are checked by the phagocytic character of the "secondary discharge" and the subsequent lymph lavage.

When the pyogenic or putrefactive organisms concerned in a bacterial infection have been overcome their effects quickly subside, and healing progresses rapidly by granulation.

The authors of the memorandum state that "the 'drawing agent' has done its work as soon as it has checked the spreading invasion of the tissues, and the wound surface has clothed itself in bright coral red granulations," and they recommend that "the hypertonic solution may then be replaced by some simple dressing." I have found, however, that the healing process may be successfully carried out from this stage by the use of more dilute solutions of the salt—e.g., $2\frac{1}{2}$ per cent.

The authors also recommend that $\frac{1}{2}$ per cent. sodium citrate should be combined with the sodium chloride in order to render the lymph incoagulable. This agent has not so far been available, but I believe that a freer discharge might be induced by the use of some such decalcifient.

When I first adopted the method it was my practice in dealing with bacterial infections to wash out the wound with an antiseptic before applying the salt solution. This was done with a view to effecting a partial sterilization of the wound cavity, or, at any rate, producing an unfavourable medium, and so inhibiting microbial growth. In the light of further experience this procedure seems unnecessary, if not actually harmful, as it will tend to paralyse the phagocytic action of the leucocytes. In any case, if it is considered advantageous to use an antiseptic in conjunction with the lymph lavage treatment, such an agent as perchloride of mercury should not be employed, as, by its action in coagulating albumin, it interferes with the free outflow of lymph which is so desirable.

In clean-cut wounds of recent origin I have found that applications of a comparatively weak solution of the agent, e.g., 2½ per cent., effectively prevents suppuration, and uninterrupted healing is the rule; while in the case of suppurating wounds, abscess cavities, and indolent sores, the purulent discharges are quickly cleared up, and the wound surface assumes a "healthy" appearance.

In contused wounds of a necrotic type, such as saddle and surcingle galls, the use of the hypertonic solution has proved of marked value. After the surgical removal of the necrotic core, the slough of the remaining necrosed tissue is aided by the copious discharge of lymph, while the active phagocytes which the latter contains would also seem to play an important part in the absorption of the dead material.

Before adopting "lymph lavage" I experienced considerable difficulty in dealing with these bacterial infections which give rise to the conditions known as "gaseous gangrene" and "gas phlegmon," and which occur as fairly common sequelæ to projectile wounds, and to contused wounds the result of kicks. I have had no opportunity of carrying out a bacterial investigation into the cause of the conditions, which are presumably due to an aerogenic putrefactive organism—possibly the bacillus of Welch. These conditions, which proved very resistant to antiseptic treatment, are quickly overcome by "lymph lavage."

I have not so far observed any unfavourable symptoms which might be regarded as attributable to the treatment, except that on one or two occasions I have met with cases which in the

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progress of healing exhibited a tendency to the formation of exuberant granulation tissue. This, however, may be restrained by the adoption of suitable measures and the strength of the salt solution reduced.

On the other hand, the method possesses several advantages apart from its therapeutic value. Common salt is very cheap, and is always obtainable in the field, while the simplicity of the treatment renders it easy of application.

ENTERO-HEPATITIS OR BLACK-HEAD IN TURKEYS.

Notes and Experiments.

By CHAS. H. HIGGINS, A. B. WICKWARE, and N. M. GUIOU.

There have been undertaken at this laboratory for the past few seasons a number of experiments having as their object the rearing to maturity of turkeys from a flock of infected birds.

The researches into the nature of this malady have been connected with the etiology, diagnosis, treatment, and prophylaxis. It is to be borne in mind that what we may offer is intended as a synopsis of our work and observations and not as a full treatise on the disease. As our experiments have been conducted on a small scale, too much dependence cannot be placed upon the interpretation of the reactions or the results obtained.

Etiology.

At the outset we may state that we accept, in the absence of incontrovertible data, the amœbic theory of the disease, originally reported by Theobold Smith in 1894-5.*

We have conducted numerous experiments with amœbæ from the more common sources with a view of familiarizing ourselves with the methods of cultivation. It having been reported by various observers that amœbæ normally exist in the intestines of many animals, plate cultures were made from a variety of sources. Plates were inoculated from the intestines of nine guinea-pigs, and two of these yielded growths of amœbæ. The site from which we took the material was, in most cases, the cæcum. Cultures taken from two frogs which it was expected

* U.S. Department of Agriculture.

would be more likely to harbour amœbæ than any of the other animals, resulted negatively. A few amœbæ were obtained on a plate culture made from the intestine of a toad, while the intestine of an English sparrow yielded amœbæ in abundance. The usual method of inoculating the plates was to smear some of the intestinal contents directly on the surface of the medium. In the case of the sparrow and toad, however, the intestine was removed from the abdomen, slit open along its entire length and left in a Petri dish of dilute alkaline broth for a few days. At the end of that time some of the scum which had collected on the surface of the broth was transferred to the surface of a solid medium. This method was found to yield satisfactory results. In the case of the turkey, amœbæ have been obtained in abundance on a plate culture made from a liver presenting the characteristic lesions of entero-hepatitis, but we have not secured this positive result in every case, and further observations are necessary before we can be sure that the lesions of entero-hepatitis constantly yield a growth of amœbæ. A plate culture from the diseased cæcum of a turkey affected with entero-hepatitis showed the presence of amœbæ after three months.

On several of the amœbæ plate cultures of animal origin the presence of actively motile paramecia was noted, and, in the case of the culture from the cæcum of the turkey affected with entero-hepatitis several other varieties of actively motile protozoa were present.

In addition to these studies of organisms thought to bear some causal relationship to this disease, inoculation experiments with pathological material obtained at autopsy have been carried out to a limited extent on some of the laboratory animals with a hope that some light would be thrown on the etiology of this affection. The experiments performed are listed below, but as many of these have not been repeated we cannot attempt to draw any general conclusions therefrom. A great advance would be made in the study of the disease could it be communicated to some of the more easily handled laboratory animals.

Diagnosis.

The diagnosis of entero-hepatitis in acute cases presents no difficulty. This loss of muscular tone producing moping with drooped wings and head, the cyanotic appearance and sometimes

atrophy of the normally red appendages about the head, and the passing of liquid, yellow, malodorous droppings, produces a clinical picture that cannot be mistaken. In addition to the above mentioned well-marked symptoms, we have noticed in some of the birds a red ring around the anal orifice at the muco-cutaneous junction, and in these birds a distinctly pinkish coloration of the scaly portions of the legs is quite obvious. In young poults the liver lesions may sometimes be seen through the thin abdominal wall. On *post-mortem* examination the liver spotted with yellow areas about the size of a 10 cent piece and the greatly enlarged cæca are quite characteristic. The ureters have been observed to be full of yellow pigment, so the origin of the yellow pigment in the droppings is at least partly accounted for. It is reasonable to suppose that the yellow pigment produced in the liver lesions is carried by the blood stream to the kidneys and there eliminated.

The following table appears to indicate that a sub-normal temperature is a feature of the disease:—

Turkey	Temperature	Turkey	Temperature
293*†	106	347	107·2
443*	106·2	351	107·3
401*	107	402	107·3
317	107·1	31	107·4
461	107·2	449	108·1

* Clinical case of blackhead. † Died of the disease on the following day.

The Serum Diagnosis of Entero-hepatitis.

Considerable work has been conducted in an endeavour to obtain a method for the serum diagnosis of this disease with the hope that it might be of service in determining the existence of an infection in chronic carriers. We are unable to say at present whether the disease will admit of diagnosis in this manner, but a brief summary of what has been done is here given.

The first difficulty that presented itself in endeavouring to diagnose the disease by the serum method was the absence of the causative micro-organism from which to prepare our antigen. Accordingly we have endeavoured to obtain an active antigen, using therefor a modification of Wassermann's original reaction for the diagnosis of syphilis, in which the antigen is prepared from a liver rich in spirochætes.

We find that the best method of obtaining the sample of blood from the turkey is to make a small incision with the point of a

sharp scalpel over one of the large veins on the under surface of the wing, the incision running lengthwise of the vein and extending through the skin, superficial fascia, and the wall of the vein. The blood is collected in a flat-bottomed vial. In this way 25 c.c. of blood can be readily obtained from an adult bird. The ordinary method of taking the sample in one of Wright's blood capsules has been found to be unsuitable in the case of the turkey, for owing to the high temperature of the bird the blood clots almost as soon as drawn and plugs up the small arm of the tube. The serum is drained off the clot and inactivated by heating from 55° to 58° C. for thirty minutes.

Two kinds of antigen were prepared, alcoholic and saline. The alcoholic antigen, prepared from black-head liver in the same way as "syphilitic" antigen is prepared from guinea-pig liver, at first gave satisfactory results but subsequently developed hæmolytic properties and had to be discarded. A saline extract of black-head liver was prepared by shaking up the diseased tissue with glass beads for about three days in the shaking machine. It was proved to be non-hæmolytic, and 1 c.c. of a 10 per cent. solution was found to fix 3 M.H.D. of complement. The guinea-pigs which had already been injected with black-head liver emulsion were given several injections of this saline extract at four-day intervals. At the end of the time the serum of one of these guinea-pigs, when examined for antibodies, gave complement fixation with the saline entero-hepatitis antigen and alcoholic entero-hepatitis antigen, but not with alcoholic antigen prepared from guinea-pig liver. Had this experiment resulted negatively it would have shown us that there were no antibodies for our supposed antigen and attempts to get a serum diagnosis would have been useless. The positive result while not by any means proving that there are specific antibodies for our antigen at least allows a possibility for their existence.

An attempt was then made to apply the complement fixation test to several of the laboratory turkeys, some of which were supposed to be chronic carriers of entero-hepatitis infection. The quantity of serum which contains enough amboceptor to combine with the minimum hæmolytic dose of complement varies in different diseases. In syphilis 0·05 c.c. is sufficient, while in glanders 0·1 to 0·2 c.c. are required. It was thought that as the birds at that time did not have the disease in an acute form

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a large amount of serum would have to be used in order to get enough antibodies. Accordingly 1 c.c.* was used. The result was that practically every tube showed complement fixation. On consulting the control tubes it was found that the turkey serum alone was fixing the complement. This rendered the estimation of the complement-fixing power of turkey serum necessary. This was accomplished with a mixture of the sera from different turkeys, and it was found that 1 c.c. of turkey serum fixed six doses of complement.

The next time the test was applied serum was obtained from a turkey affected with entero-hepatitis, and serum from a young healthy poult was used as a control. The necessary allowance was made for the complement fixing power of the turkey serum and antigen, and the result of the test was complete hæmolysis in the case of the young turkey serum with a slight evidence of complement fixation in the tube containing the entero-hepatitis turkey serum. The control tubes showed that the hæmolytic system was working and that none of the substances used fixed all the complement themselves.

It was then thought that the requirements necessary to make the test practical were to ascertain by repeated trials the right strength of antigen and the right quantity of entero-hepatitis turkey serum that would cause a complete suspension of hæmolysis in a positive case. The test has since been conducted with various quantities of antigen and turkey serum, but it has been found that while there is undoubted evidence of complement fixation that the serum control tubes also show a certain amount. This would indicate that the complement fixing power of turkey serum is very considerable, and a large amount of work will yet have to be undertaken to determine whether this is a variable factor in the test before we can say that the disease admits readily of a diagnosis by the method of complement fixation.

Precipitins.—It has been found that entero-hepatitis turkey serum gives a precipitate when added to extracts of diseased liver, but enough work has not been conducted in this connection to enable us to express an opinion as to the specificity of this reaction.

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* As a matter of fact this part of the test was performed in small tubes, a definite quantity in a nippled capillary pipette being taken as equivalent to 1 c.c.

Prophylaxis.

In endeavouring to discover methods which will prevent the spread of this disease, we must first find some measure which will as efficaciously as possible stop the transmission of the disease from parent to offspring, or, from the chronic carrier to the healthy bird. Furthermore, this method must at the same time be of such a nature as to admit of the practical employment by the average farmer.

The ideal to be attained is to have a flock free from disease, start this flock in clean sanitary surroundings, and breed from them without the introduction of new birds which may be chronic carriers of the disease. In our judgment it would be better to raise a flock from the eggs by artificial incubation and brooding.

An attempt has been made to raise a healthy flock from birds that are known to be infected by incubating the eggs and keeping the poults on ground where turkeys had not previously been quartered, and never letting them come in contact with the adult birds. As a control, a small flock of naturally hatched poults were allowed to run with an adult hen turkey which had been a member of the infected flock.

This experiment was unfortunately interfered with by the crows destroying a large number of the incubated poults, but the experiment was still continued. It may be said that no dependence could be placed in the experiment should the isolated turkeys not develop black-head, as some farmers' flocks are healthy anyway; but it must be borne in mind that the disease exists in a virulent form in the flock of adult birds at the laboratory so that there is every opportunity for the disease to be transmitted from parent to offspring.

The result of the experiment has been that four poults allowed to run with the adult bird have developed the disease and three deaths have occurred, while as yet no evidence has appeared of its existence in the isolated birds. It must be admitted that the experiment has been necessarily conducted on an exceedingly small scale and that it will have to be repeated several times before we can attempt to draw any conclusions. The fact that at the present time among the adult birds and the poults that have come in contact with them there have been several clinical cases of black-head, and deaths have occurred, while the isolated, artificially incubated birds are free from the disease, gives

promise of further investigations into this system of prophylaxis resulting favourably.

Treatment.

In searching for a remedial agent for this disease we have endeavoured to investigate some of the substances used in the treatment of protozoan affections. It was first necessary to determine the dose for the turkey and then as cases occurred the effects of these agents were noted.

There is to our knowledge no known specific for controlling the ravages of this affection.

Muriatic Acid.—The use of the muriatic acid in the drinking water was found some seven years ago to be followed by beneficial results on affected turkeys which one of us (Higgins) endeavoured to raise. Later it was given a further trial, and three years ago a single turkey at this laboratory made an apparent recovery. During the past four years we have recommended it as being the best medicinal agent which we know to assist in overcoming the affection. A large number of the affected birds have recovered after receiving liberal allowances of this acid.

Some apparently remarkable recoveries have followed the use of this acid, but one cannot hope to bring all affected birds through an attack.

The acid used is a teaspoonful of muriatic acid (Acid Mur. Dil. B.P.) in a quart of drinking water. This acidulated water should be placed in a porcelain or glass vessel and is suggested in the hope that the birds may be carried over an acute attack. At the outset, when the birds show evidence of being severely affected, it may be of advantage to triple the amount of acid (using three teaspoonfuls to the quart of water) for the first three days. This amount will not injure the turkeys and may assist them in more rapidly overcoming the infection.

They should be confined during this period on dry, sanded board floors, in well-lighted and well-ventilated quarters and allowed access to no other liquid. If allowed to roam they may obtain sufficient water for their requirements from the dew-laden grass or other sources, and therefore will not drink the acidulated water. If confined, green food should be supplied in addition to the grain ration.

Atoxyl.

The use of this arsenical preparation in trypanosomiasis has suggested its use in this supposedly protozoan affection. Up to the present time we have only determined what would be a safe dose for a turkey, as we have not had a case to try it on without interfering with our other experiments. It has been found that the hypodermic injection on four successive days of amounts increasing from 1 c.c. to 2 c.c. of a 4 per cent. solution have not been followed by untoward result.

Active Immunization.

It was thought that the injection of extracts or emulsions of diseased liver might assist in the treatment of the disease by helping to create an active immunity. It has been found, however that injections of saline extracts have no beneficial effect while the injection of liver emulsion apparently increased the severity of the cases on which it was used, probably by causing a severe anaphylactic reaction.

Provision has been made for the further pursuit of this very important and interesting problem. We anticipate being able to arrive at more tangible conclusions in our projected experiments as a result of the experience already gained. We would point out, however, that in the last report of the Director of the Rhode Island Experiment Station, he states that they seem to have made comparatively little progress in overcoming the ravages of this disease. The work was commenced at the Rhode Island Experiment Station in 1894 by Dr. Theobold Smith and has since been continued under the direction of various investigators. Apart from the very valuable data secured by Theobold Smith there has been a very little in the findings from time to time reported from this station having a bearing on the practical measures to be adopted in overcoming this affection.

Conclusions.

(1) Entero-hepatitis or black-head in turkeys is a disease affecting the liver and cæca (blind guts) caused by the amœba meleagridis, described by Dr. Theobold Smith in 1894-5.

(2) Recovery from an attack during the first season may be followed by one or more attacks during that season through which they may or may not pass in safety. Turkeys after 1 year

of age rarely show evidence of the disease, yet on autopsy may present lesions.

(3) Turkeys [as outlined in (2)] may pass through an attack of this affection, after which they are chronic carriers of the infective agent for an indeterminate period.

(4) Treatment of affected birds may or may not be effective. Muriatic acid has given good results, but is not infallible. It can be used without fear of untoward results. Emetine hydrochloride has been effective in a few instances, but is too dangerous for general adoption and can only be used under skilled direction.

(5) The hatching and rearing of turkeys by artificial means on uninfected ground and away from other fowl gives promise of a means for overcoming the ravages of this malady.

(6) All weak or inferior poults should be destroyed at once and none but the most vigorous individual birds retained for breeding purposes.—*From Report of Veterinary Director-General, Department of Agriculture, Canada.*

EFFECTS OF HEREDITY IN BOVINE TUBERCULOSIS.*

By HARLOW BROOKS, M.D.

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That a very high percentage of dairy cattle are tuberculous, that is, are "reactors," is a universally admitted fact. State and municipal laws are more and more insisting that the milk of tuberculous animals shall not be sold, and the question of bovine tuberculosis has become a serious economic as well as hygienic problem. When one realizes that for general use milk must be furnished at a rate which can be paid by the average citizen and at the same time appreciates the fact that the dairyman must expect from 15 to 50 per cent. of his stock to be ruled out if the tuberculin tests are rigidly enforced, the problem of milk supply becomes a factor of very great difficulty as well as importance. A further fact of great bearing is the strong probability that the more highly blooded cattle are most likely to be

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* Read before the Association of American Physicians, May 13.

found to be reactors. This makes the problem of the honest and ambitious dairyman even more difficult, for if he attempt to increase the quality of milk or the butter production of his herd, he almost invariably breeds in tuberculous stock, and unless extraordinary and expensive methods of isolation are practised dissemination of the infection is almost certain to follow. On the other hand, if he fails to thus improve his stock he is very likely to get into trouble because the quality of his milk may be found deficient and he thus also lays himself liable to prosecution.

The difficulty of improving breed is a very serious matter, particularly for the farmer of small capital, since the price of blooded stock is always high and he is very likely to purchase as non-reactors cattle which have been "plugged" against the tuberculin reaction by dishonest dealers. This trick of "plugging," though familiar to most stock men, I find is not widely known by physicians. There is no doubt but that when tuberculin tests are known to be about to be made, this method is practised so that negative results are obtained even in cattle which may be extensively so diseased. "Plugging" is performed by injecting a dose of tuberculin a few days before the public or legal test. For some time after the reaction which follows this injection, subsequent tuberculin tests are negative so that even widely diseased animals may be tested and sold apparently as free from tuberculosis. As can be seen, detection of this fraud may be practically impossible.

Another point often unrecognized by the hygienist is that the tuberculin test in cattle as in man is positive in animals which while they may harbour foci of the disease are not actively tuberculous, that is, the reaction may be given by cured cases. If we were to apply to man routine tuberculin tests it is certain that we should find many supposed and actually healthy individuals who would respond to the reaction. The term "reactor" is therefore indiscriminately applied by stock men to animals perhaps not actively or obviously tuberculous and yet which simply give the reaction. It is found, however, that when such stock, apparently otherwise sound, be housed and fed with perfectly healthy non-reactors the non-infected herd sooner or later become widely diseased for the sensitiveness of uninfected animals to tuberculosis is remarkable and apparently much greater than in man. The common practice of dairy men is to largely ignore

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this fact, to take the chance as part of the risks of the business, and to eliminate only such animals as are obviously sick. These usually form but a small percentage of the real reactor group and under such methods the disease can never be eliminated from the herd.

The problem then becomes very complex, particularly from an economic standpoint. It is true that thorough pasteurization of milk will eliminate the possibility of transmitting tuberculous infection to man. I do not propose to enter into the discussion of this problem at this time but to especially point out that reactors in any herd eventually cause the more or less complete infection of that group.

The experiments conducted at Woodcrest, previously reported,* have apparently furnished a solution for this problem though it must be admitted a very expensive one indeed for the breeder of moderate capital, since it practically necessitates separate and distinct establishments and personnel, and enough capital to permit a more or less idle and largely non-productive group of animals.

To me personally the fact of greatest interest has been that the inbreeding of tuberculous animals has in no way impaired the type or desirability of the offspring. It has been conclusively shown that the calves are very rarely, if ever, infected before or at birth. That the slightest carelessness in exposure of the newborn calves to infection leads to certain disaster is illustrated by ten recent infections at Woodcrest through the negligence of one workman in not minutely following out the instructions laid down. Tuberculous animals of desirable types may therefore be freely used for breeding purposes provided that the calves are not allowed to come in contact with the infected parents. The economic as well as the biological importance of this apparent fact is obvious.

To establish the fact that reactors may furnish and perpetuate most desirable traits as to type, fertility, milk, and cream production, and to therefore controvert the suggestion that such infected animals should be utterly destroyed, notes of the following group of animals are presented, taken by permission of Mr. Dimick from the records of Woodcrest Farm.

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* *Trans. Soc. Exp. Med. and Biol.*, 1914, vol. xi, No. 2, p. 50.

Pietje 22d, No. 70884.—The foundation dam of this strain was imported from Holland by the Woodcrest Farm. She was supposedly of the highest type representing the Holstein-Fresian breed and her pedigree shows descent from the finest animals of this stock. It has not been possible to ascertain whether or not she was derived from tuberculous parentage, but early tests at the Woodcrest Farm showed her to be a "reactor," although apparently in perfect health. She died of generalized tuberculosis at the age of fourteen years, four months. She is credited with four calves born in Holland and seven in this country. She made the following remarkable record:—

Butter, seven days' test	31·62 lb.
Milk, seven days' test	673·90 ,,
Butter, thirty days' test	128·37 ,,
Milk, thirty days' test	2,786·40 ,,
Butter, six months' test	566·60 ,,

This last item is stated to be the world's record for butter production for this time. During this same period she produced 13,673·90 lb. of milk. While at the Woodcrest Farm she gave birth to an annual calf with records as follows:—

(1) *Woodcrest Pietje.*—A bull calf; a perfect and effectively fertile specimen, sold as a herd bull. This animal is not known to be tuberculous, although it is strongly probable that he is.

(2) *Pietje 22d's Woodcrest Lad.*—This animal is a perfect specimen in every respect and has been retained at the head of the Boutekou Farm as a stud animal. He is known to be tuberculous and is isolated with the tuberculous herd. A daughter of this animal has produced at the age of four years 35 lb. of butter in seven days. This is stated to be a world's record for this age.

(3) *Pietje 22d's daughter.*—This animal at birth was a perfect specimen in every apparent respect, although she was found to be tuberculous in the second year of her age. Her record is as follows:—

Butter, seven days	25·19 lb.
Milk, seven days	553·40 ,,
Butter, thirty days	104·29 ,,
Milk, thirty days	2,202·22 ,,

She was fertile each year and her offspring have all been perfect specimens of their kind. She died in January last from a generalized tuberculosis one week after the delivery of her last and perfect calf. This animal has not yet been submitted to the

tuberculin test but inasmuch as it was removed from the mother immediately after birth, from previous experience, it is assumed to be non-tuberculous. She was the dam of Woodcrest Jamaica Pietje; a bull calf, perfect in every respect and now the head of a valuable herd. This animal has proved to be normally fertile. A daughter in her second year has given a butter record for seven days of 16·07 lb., and of milk for the same time of 350·30 lb. Woodcrest Jamaica Pietje was removed from the dam at birth, isolated from the tuberculous herd, and is free from any disease. Also dam of Woodcrest Johanna Pietje: a perfect and fertile bull. He is free from tuberculosis as he was removed from the dam immediately after birth. Dam also of Woodcrest Pietje Pontiac: a perfect male specimen removed from the dam immediately after birth and consequently free from disease. This animal was sold while a calf for $2,000, and is the anticipated head of a valuable herd.

(4) *Pietje 22d's second daughter.*—This animal has always been tuberculous, having received the infection apparently from her dam shortly after birth, none the less she was in every way a perfect specimen and gave a record of butter production for seven days of 29·63 lb.; of milk in the same period 584·70 lb. Butter thirty days, 117·24 lb.; butter for one year, 829·53 lb. Milk for the same time, 19,722·90 lb. This animal died apparently from a generalized tuberculosis in September, 1913. She had been fertile each year since her maturity and all her calves were normal specimens. Three of these offspring are recorded all perfect, typical, and fertile in every way.

(5) *Pietje 22d's son.*—This animal is a perfect specimen, although found to be tuberculous at the age of one year. He is at the head of a herd, serving about 100 animals yearly; is very fertile and typical of the breed in every way. His first five daughters at two years of age average over 18 lb. of butter in seven days each and over 4 per cent. of fat.

(6) *Pietje 22d's third daughter.*—Found to be tuberculous at three years of age; after having successfully passed two prior tests. Her record shows butter production in seven days, 16·07 lb.; milk production seven days, 302·30 lb. This animal is the dam of one heifer which has not yet freshened but which is a perfect specimen of her class.

(7) A bull calf, the last offspring of this remarkable cow, died

of an infantile diarrhœa in its very early youth, before it had been registered.

The male parentage in many if not most of these instances has been also tuberculous in all probability. The question of whether or not the offspring became tuberculous depends entirely upon exposure after birth. The point of greatest importance illustrated by this remarkable family is that no defects of a biological nature have been found in any of the offspring of this definitely tuberculous stem. All are perfect specimens. There has been no reduction in fertility, and judging from the milk and butter records no diminution in butter or milk production, and, as stated, several world's records have been attained by these animals.

This family is apparently fairly illustrative of others of like nature, and in so far as the observations go it seems definitely demonstrated that parental tuberculosis in the cow causes no defects to be apparent in the offspring even though the calf be born in the almost terminal stages of the diseases in the dam.

This report is also intended to point out that the term "reactor" as used by stock men often means what in human medicine would be classed as healed tuberculosis. It seems to show that definitely tuberculous animals may be safely utilized for breeding purposes and that they may be crossed and inbred with entire disregard of the factor of tuberculosis and purely for the purpose of improving or maintaining type. Most important of all, the fact stands out that although it may not be wise to utilize the unpasteurized milk of reactors for human consumption nor yet for the feeding of calves or other animals, yet reactors may be successfully and safely used as brood stock and thus cease to be an economic waste.—*American Journal of the Medical Sciences.*

VETERINARY COLLEGE PASSES.

The following students passed their respective examinations, viz.:—

"*A*," *or First Professional.*—William U. Main, Glasgow.

"*B*," *or Second Professional.*—Isaac McCauley, Kilrea, Ireland.

"*C*," *or Third Professional.*—David E. Orr, Glasgow.

"*D*," *or Final Examination (obtained the Diploma of the Royal College of Veterinary Surgeons).*—Archibald W. Campbell, Wishaw (Second-class honours); Thomas M. Timoney, Glasgow; Neil A. M. Macewan, Ardrishaig; Henry J. Hughes, Pontypridd, Wales.

Clinical Articles.

OBSERVATIONS ON "PURPURA HÆMORRHAGICA" IN THE HORSE WITH "ADDENDA" OF ALLIED AFFECTIONS.

By FRED. C. MAHON, M.R.C.V.S.
63, Above Bar, Southampton.

Recently encountering some bad cases of "purpura hæmorrhagica" in two instances following upon bastard strangles, in another a sequel of influenza, and adopting a line of treatment far remote from the orthodox, I am induced to record the same in the pages of The Veterinary Journal.

One subject was a thirty-year-old bay mare "which had not previously had a day's illness"—according to the owner. Grazing on herbage already invaded by some Army and other animals the mare had suffered severely from strangles—febra-pyogenica—was evidently invaded by the poison, and to such an extent that at one time I feared dissolution. The parotideal swelling, and resultant abscess after blistering and opening of same, took on a bad ulcerative process, the cavity measuring 13 in. in circumference at one time. Throughout the seizure the appetite was never remiss, and temperature did not exceed 104·3° F. In this case my treatment was by tonics, as acid nitro-hydrochloric dil., liq. ammon. acet., and infusion of gentian in scalded hay, chaff, corn, and bran. In lieu of cantharides, or mercurial blister, I used repeatedly mustard oil, an agent I use extensively.

I gave hypodermically injections of strychnine and electuary of potass. iodidi, belladonna, and glycerine.

As an attack of purpura supervened on the tenth day I had recourse to adrenalin—my sheet-anchor in almost all cases—but if asked to explain why such good results follow in my experience I am afraid I cannot give a precise reply. Whilst writing of adrenalin "and its use in purpura," &c., let me quote a very able American writer, observer, and clinician (*vide* "Veterinary Materia Medica," fifth edition, p. 10 (Parke, Davis and Co.)).

Dr. J. H. King, of the Kansas City Stock Yards, states in "Veterinary Notes" of December, 1908, p. 12, that he finds adrenalin is a reliable means of diagnosing the presence of "heaves" (broken wind, asthma, emphysema of lung tissues).

Even though the horse has been drugged with stramonium or other sedative, he says: "I noticed that upon injecting intravenously 30 minims of adrenalin chloride solution in ½ oz. of normal salt solution the breathing became accelerated in about one minute, and if the animal was only slightly affected with the disease it would immediately show the double respiratory act, or double abdominal breathing, accompanied by the usual action of the costal muscles unabated for several minutes. I have used adrenalin chloride as a diagnostic agent for the past three years with the greatest confidence. In order to verify my diagnosis, I have kept track of these cases, and have always found afterwards that I was correct."

I refer to these notes as it was by accident in using same in Case No. 2 of purpura in another aged mare on the farm where my thirty-year-old "nag-mare" had strangles, followed by purpura and broken wind setting in suddenly, that after the first injection of 90 minims of adrenalin chloride my patient's breathing became normal, and this condition remained so for thirty-six hours approximately, and with the hæmorrhagic infarctions, petechial spottings of mucous membranes, and œdema, the broken wind was again noticeable. This to my mind opens up a serious question as to whether fraud is not possible by injections of horses prior to sale, and particularly if put to the crucial point. Post-mortem results and chemical analysis would not afford the practitioner or purchaser of a broken-winded horse much satisfaction, if at all.

Briefly, Case 1, a twelve-year-old mare (heavy van), cardiac weakness marked, temperature 98·6° F.; pulse, submaxillary 68 per minute, cardiac 90; both small, weak; intermittent œdema of all four legs, causing animal to remain a fixture in her stall. Head pendulous for two days, and animal stupefied, forcing head into a corner, and remaining in this position for hours. Here adrenalin repeatedly used. Saved this case. In fact, I have only attended her for a week. Value originally knacker's price. To-day worth £20.

Case No. 2.—Thirty-year-old "nag-mare." Here again chief agent used adrenalin. Results marked. Recovery.

Case No 3.—Thirty-year-old "cart mare." Purpura and broken wind. Again adrenalin chloride effected wonders, and I attribute recovery entirely to its judicious use.

Case No. 4.—Peculiar from onset. Diagnosis, "lymphangitis." Near hind limb markedly so. Off hind slightly. On third day knuckling over of near hind fetlock. "Dead lame." Shoe removed. No mischief apparent. Soap and iodine liniment, injections twice daily of adrenalin chloride 60 minims, liq. ammon. acet. in drinking water, bran mashes, linseed boiled, also linseed tea. One injection of physostigmine. No drenching. Recovery on tenth day and at exercise. Work in three weeks from seizure. One noticeable feature of this case was a symptom as if the animal had had a paralytic stroke. I believe some clot of blood or clots had formed in the renal vessels at one time, as the urine collected on three occasions showed on examination broken-down urine casts and red blood corpuscles. Here I used thermofuge to the loins, covered with wool, blanket, and surcingled well.

How is it that "adrenalin" is so marked in its physiological actions? Summarizing the conditions in which it is used by surgeons scattered throughout the globe, I find mention of it in *post-partum* hæmorrhage, epistaxis, hæmoglobinuria, lumbago, gravis conjunctivitis, laminitis, parturient laminitis, collapse following gun-shot wounds, keratitis, and other ocular diseases, azoturia, chronic hæmorrhagic nephritis, purpura hæmorrhagica, pleural effusions in the dog, and heaves (broken wind), and if one searched closely the pages of veterinary literature no doubt its employment may be noted in scores of other cases. In passing, I wonder if the sister profession uses it as we veterinarians do. Their records should prove interesting in the extreme.

To my mind it is a potent agent for good, and has revolutionized the treatment of many diseases, so should be glad to have records of its use and cases treated, recorded fully and more ably by the pens of the ready writers of our profession.

STRYCHNINE POISONING IN A DOG.

By HENRY TAYLOR, F.R.C.V.S.

Haywards Heath.

Poisoning by strychnine is not a very uncommon occurrence in the dog, the typical symptoms following quickly upon the ingestion of the drug as a rule. The following case presents one or two interesting features and may thus be worth recording.

One day, at 12 o'clock, a Dachshund dog, fond of hunting, came into his owner's house with the head of a young rabbit in his mouth, and judging by the rotundity of his abdomen, a good deal more of the afore-mentioned rabbit in his stomach. He remained quiet all the afternoon until 6 o'clock, then he got up from where he had been lying and walked out of the room through a window, which was low on the ground, on to a lawn, and from thence down some steps. When he reached there he had a fit, but pretty soon came round again. I was requested to see him then, and on my arrival found him apparently all right. I was informed that that morning a fox had been found dead near the gate at the end of the drive, presumably poisoned, and the question was asked, "Did I think the dog had got any poison?" The reply was to the effect that if the fox had been poisoned the chances are that the dog would not have been alive now, presuming he had partaken of the same bait. Seeing that he had dined, however, not wisely but too well, I suggested giving him a good dose of castor oil. The administration of this was then proceeded with, but he was a troublesome dog to dose, so a small pill in a bit of meat was offered instead, which he accepted. Just as I was about to depart, it was then about 7 o'clock, I noticed that he was walking about the room when suddenly he developed the characteristic symptoms of strychnine poisoning. There was no doubt about the matter now, and the provision and administration of large doses of chloral hydrate and potassium bromide was carried out.

Fit after fit came on in spite of the antidotes which were pushed to excess; the case looked hopeless, and it seemed preferable for him to succumb to chloral hydrate rather than the distressing strychnine, but after an hour or so he fell into a sound sleep, from which he did not awake till 3 o'clock next morning. Then he had another series of attacks, in one of which the owner thought he was dead. Chloral hydrate was again administered with success and he was finally got to sleep again. At 10 o'clock that morning he seemed drowsy and the liability to any more attacks to have decreased; as a matter of fact, from that time he gradually became better.

There are one or two points of interest about this case. The length of time which elapsed between the partaking of the poison and the onset of the first fit, viz., six hours, is un-

usual, and it was really one hour longer before the fits became diagnostic. Then, again, there was a marked recurrence after being under the influence of the antidote for, say, six hours. The fox probably died from strychnine poisoning, but if he had lived any length of time after eating the poison he would not have been found where he was, which indicates a good dose of the drug. The dog may have had his share of the alkaloid in the centre of a large piece of rabbit and this lump have taken hours to digest. The animal was never out of sight from 12 o'clock onwards, so there was no opportunity to pick up anything, and the length of time which elapsed before the symptoms came on seemed to negative the utility of an emetic. From the above instance it does not appear that one need be afraid of using plenty of chloral hydrate which is *the* antidote. Some years ago while attending a horse my attention was drawn to the stable dog which was showing symptoms of strychnine poisoning, *but not to any marked degree*, and although I used strong decoctions of tobacco with unstinted liberality, because it would have taken too long to obtain chloral hydrate, the dog died. The poison had been put down by the coachman's wife to destroy mice.

PNEUMOTHORAX IN THE COW CAUSED BY THE PRESENCE OF ECHINOCOCCUS CYSTS IN THE LUNGS.

By HENRY B. EVE, M.R.C.V.S.
Folkestone.

Subject.—An aged cow, in somewhat poor condition, suspected by the owner to be a "piner," a bad doer.

History.—The animal had been bought at an auction sale by him, then in fair condition, was taken home and fed on rations along with the rest, which were all in good condition. However, in spite of good food and treatment, it began to gradually waste away soon afterwards. The cow had been ailing for a fortnight, and owner had tried doctoring it himself, but without success.

Symptoms.—The subject appeared dull, listless, unthrifty, visible m. membranes pale, discharge from the eyes and nostrils, had a staring coat, capricious appetite, and gave very little milk,

which was of a watery nature. Pulse was weak; respirations accelerated in rhythm like a broken-winded horse; temperature subnormal. Auscultation of the lungs denoted pneumothorax present on both sides, the right side apparently being more affected than the left. The udder was indurated in left quarters, and non-painful on manipulation. The cow had a nasty hacking cough, which was more noticeable in the early mornings, and the bowels were generally relaxed, but at times constipated. The abdomen was pendulous (pot-bellied), anasarca swellings present, also tympany of the stomach.

Diagnosis.—Chronic emphysema of the lungs.

Prognosis.—Unfavourable.

Treatment.—Tested the animal with tuberculin (ophthalmic) with negative result. Gave internally stimulating tonic powders in warm ale (pulv. ammon. carb., zingib., gentian, ferri sulph., calumba, and pip. cayenne), alternately liq. arsenicalis in drinking water. However, no improvement took place, so advised slaughter and *post-mortem.*

Diet.—Crushed oats, bran, decorticated cotton cake, hay, brewers' grains, cod-liver oil, common salt.

Post-mortem.—Revealed no signs of tuberculosis or Johne's disease, but a number of echinococcus cysts of the multilocular variety present in the lungs, one of which near the base of the right lung had burst, and allowed the air to escape from the lung. It was evident that the air which escaped entered the "parietes" of the chest, where the ruptured vesicle was found, and where destruction of tissue from pressure had occurred. During inspiration air had been pumped through the opening, and the emphysema spread by the respiratory movements along the subcutaneous tissues till it reached even the kidneys, in which latter region there were two large "air vesicles," even the surrounding kidney fat being blown up with air which had penetrated the tissues. I was unable to find any trace of any foreign body in the lungs or elsewhere.

Remarks.—I have seen echinococcus cysts present in old sows when making *post-mortems* dealing with suspected cases of swine fever, also in sheep, but never before in cows. In view of Tuberculosis Order, I thought the case interesting to veterinary inspectors under the same, as it clearly shows that emaciation can obviously arise from other causes than tuberculosis, and thus is worth bearing in mind.

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LACTATION IN A SEVEN-DAYS-OLD CALF.

By J. WILLIAM FINK, D.V.S.
Newburgh, N. Y.

A Holstein calf born July 4, 1915, had a fully developed mammary gland secreting milk. The udder is about the size of two large fists with well developed teats about 1 in. long and milking from all four quarters; the milk is of good quality; the quantity, about a pint up to the third week, has now increased until it gives a quart night and morning.

The calf is from a grade Holstein mother and a pure bred bull. Has been kept by itself since it was born (and not with other calves), except when it was nursing. It began giving milk when it was seven days old. The owner noticed the udder enlarging the first week and tried one of the teats, and found to his surprise it contained milk, and has milked it steadily night and morning ever since, until it has increased in quantity to about a quart night and morning.

There is nothing unusual about the size of the calf, being an ordinary-sized month-old calf. I have searched all records, inquired of a number of dairymen and breeders, and have been unable to find a parallel to this phenomenal calf. Have had several veterinarians and expert herdsmen examine the udder and milk to verify the truth and condition, and had them milk the calf and examined the mouth.

At present the calf is being exhibited at the neighbouring county fairs, and pronounced by everyone who sees it as a remarkable freak of nature, and unheard-of before. It surely speaks well for the Holstein breed of cattle as milk producers at an early age.—From *Journal of the American Veterinary Medical Association.*

LAMINITIS AND LEUCOCYTIC EXTRACT.

By CYRIL GOLDING, D.V.S.
Dinuba, California.

On April 24, 1915, I was called to treat a grade Percheron mare, nine years old, suffering from typical symptoms of an acute attack of laminitis. History indicated that she had suffered two previous attacks, and a very guarded prognosis was given.

The animal was in acute pain, temperature 104° F., pulse 65. Five doses of leucocytic extract (Archibald) of 6 c.c. each were administered once each twenty-four hours, intratracheally; no adjunctive treatment was given, resulting in a complete cure at the end of the fifth day of treatment.

Results obtained from the use of leucocytic extract in the treatment of several consecutive cases of laminitis have by far exceeded all expectations. Am reporting above case on account of the fact that this mare has suffered from two previous attacks, although of much less severity than present one. On previous occasions the usual routine or symptomatic therapeutics were applied, including phlebotomy, soak-tubs, injections of adrenalin chlor. into plantars, also the alum treatment, but in spite of same it has been compulsory to allow at least four weeks to elapse before she had sufficiently recovered to be able to resume her duties.

Providing such a word is permissible, leucocytic extract is a "specific" for laminitis.—*Journal of American Veterinary Medical Association.*

Canine Clinical.

AN ENORMOUSLY ENLARGED PROSTATIC ABSCESS IN A DOG.

By ARTHUR PAYNE, F.R.C.V.S.
Weybridge.

Half-bred collie, eleven years old.

History.—Had lost flesh the last three months, although appetite was good.

The only thing out of the ordinary which the owner had noticed was small pools of urine occasionally tinged with blood on the floor of the garage where the dog was housed at night.

On November 3 and days following the dog was observed to strain, as if he experienced a difficulty in passing his motion. After micturition he would walk carefully with back arched. Food was refused from this date.

Symptoms.—I saw the dog on the 8th, and straightway

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examined him *per rectum*. I found an enlarged prostate which caused the dog to struggle on the slightest pressure. The bladder was engorged.

He looked very ill, and was with difficulty persuaded to get out of his bed and walk outdoors. I was surprised to see the urine come away quite freely.

I prescribed urotropine, and told the owner I would call on the 10th.

On the latter date there was no improvement. The appetite was in complete abeyance, the dog walked with difficulty, and vomiting had become frequent.

I wished to destroy the dog, but the owner would not give his permission. He died on 15th.

Post-mortem.—The bladder, or rather what I took to be the bladder, was distended, and contained about 1½ pints of thick turbid fluid. On the right side of this distended sac was what appeared to be a second bladder, empty and the size of a small pear. The prostate was hypertrophied, but not to such an extent as I was led to believe. This second bladder was in reality the dog's bladder. Some of its muscular fibre must have given way, and a pocket formed by the mucus coat insinuating itself between them. The urine, finding that least resistance was offered here, the pocket was slowly enlarged, acting as a backwater, so to speak.

I ascribe these changes, in the first instance, to an acute attack of prostatitis. During this period resistance was offered to the flow of urine.

The over-engorgement of the bladder caused a breach in the muscular wall. When the active prostatitis had subsided the gland was reduced in size, and the urine again found its natural outlet, but the urine which had collected in the mucous coat could find no means of escape, and the death of the dog followed on the decomposition of the imprisoned urine.

War Notes.

OUR WAR-HORSES.

By FREDERIC B. HARVEY.

THERE is a suggestion of frost in the air this misty autumn morning, and the little group of military and Customs officials gathered on the quay awaiting the arrival of the "horse transport" are fain to stamp their feet and flap their arms in an endeavour to keep warm.

Nobody knows precisely when the boat may arrive in the river, because of the regulations which preclude an ordinary ship from using her wireless within a specified distance of the shore. But suddenly out of the haze a dim bulk looms; there is a spasmodic activity amongst the nondescript dockside labourers, and within an incredibly short space of time the vessel is made fast, and her huge hull towers above the landing stage.

In normal times the incoming ship is a well-known passenger boat. Now she is painted a sober black, and her holds and lower decks are filled with horses—packed as close, almost, as the proverbial herrings in the proverbial barrel. Huge doorways are cut in her side, and into these apertures gangways are run, down which the animals clatter to the land to which they have been strangers for many a novel day.

A thousand horses are on board, and wherever you go you see the muzzles of the patient beasts projecting in rows from the improvised stalls, their breaths hanging in tiny patches on the still air of the holds. An elderly little man, clean-shaven, with bow-legs, rimless glasses, and a faded pink sweater jacket, is bustling about. From his general aspect he might be a professor; and you are surprised to learn that in reality he is the chief horse-boy, and he tells you in strong American accents that they have not lost a single animal on the way across. "Some v'yage, eh, siree?" he says, beaming through his glasses. The other horse-boys include weird types, who carry with them an indescribable whiff of prairie freedom that appeals to the imagination of Englishmen—men in high-crowned hats, swarthy of skin, with soiled shirts open at the neck to the raw breeze; and with that gait and bearing peculiar to those accustomed to horses.

And whence has come the cargo, valued at £50,000, which they have so successfully brought across the seas? In Canada and America the agents of the Allies are buying suitable animals in enormous numbers. Russia alone can produce sufficient horses from her vast territories to meet all her requirements; and England, France, and Italy are compelled to supplement and conserve their reserves by huge purchases from colonial and foreign sources. A short while ago the export of horses from America averaged 25,000 a month, and of mules 6,700.

With headquarters in Canada, the English Remount Department is buying direct through its officers, with no middlemen; whereas France and Italy are relying upon local agents—men, of course, who are thoroughly conversant with their business. At the horse markets the agents sit on a raised platform, and the beasts are ridden before them, very frequently by picturesque cowboys, who pick out and catch the mounts from the herd by means of the lariat. Each animal must be free from vice and broken to saddle and bridle, and, although higher prices are paid by the British than the other Allies, our specifications are far more exacting, and ensure that we are obtaining the best horseflesh for our purposes that can be secured.

The horses we are purchasing are of three types—light for cavalry work, medium for the lesser calibre artillery, and heavy for the huge guns which modern warfare demands. Horse camps are scattered throughout the country, and the animals, tethered in long lines there, present a rough, listless appearance, contrasting vividly with their aspect a few weeks later, when the clippers have been at work, shaggy tufts of hair are trimmed into a smart, military shortness, and the vigorous training to which they are by degrees subjected has endowed them with springiness and an alert intelligence.

Although at the front the animals are more or less exposed to weather and the constant risk of shot and shell, statistics compiled in the spring of this year showed that the mortality —including even the retreat from Mons—was 15 per cent. per annum from all causes. In the South African War the mortality was between 55 per cent. and 65 per cent.

Naturally up to the time they arrive in England the horses have received no military training, but as soon as they are in condition that begins. They are taught to stand alone quietly, are gradually accustomed to sudden explosions, and are generally educated to acquit themselves reasonably well in the many startling situations which may unexpectedly confront them in the war zone.—*Sunday Chronicle.*

MILITARY HORSE SUPPLY.

Committee's Recommendations.

In August a Committee was appointed by Lord Selborne to consider what steps should be taken to secure the production and maintenance in England and Wales of a supply of horses suitable and sufficient for military purposes, especially on mobilization. The Chairman of the Committee was Lord Middleton, and the other members Mr. Chaplin, Sir Ailwyn Fellowes, Hon. A. Parker, Major Sir Merrik Burrell, Sir Gilbert Greenall, and Captain M. S. Adye. The Committee has investigated the matter fully, and issues a series of suggestions, which, if not new in their tenor, are applicable to a question that demands immediate consideration. The Committee says:—

In the course of our deliberations we have come to the following conclusions, and we beg to recommend:—

That the Board of Agriculture and Fisheries should—

(1) Institute legislation to require compulsory annual registration by the Board of all stallions that are travelled for a service fee or publicly exhibited for stud purposes.

(2) Increase the number of King's Premium stallions.

(3) Arrange for the inspection by their officers of stallions recommended for Board's Premiums.

(4) Continue the brood mare scheme in those counties in which it has proved a success, and purchase high-class mares for re-sale to selected breeders.

(5) Purchase stallions suitable for country service, and if opportunity for doing so occurs during the present financial year, arrange to obtain the requisite funds.

(6) Provide funds for the award of prizes for brood mares and foals.

(7) Arrange for a compulsory annual census of horses in as detailed a form as possible, and for more complete returns of horses exported and imported.

(8) Reconstitute the Advisory Council and County Committees.

(9) Appoint an expert staff of officers to supervise the scheme.

That the War Office should—

(1) Purchase a much larger number of horses in England and Wales.

(2) Increase their horse peace establishments.
(3) Purchase more horses direct from breeders.
(4) Purchase remounts when rising four.
(5) Purchase specially selected fillies and leave them with breeders until they have produced and reared foals.

Finally, we wish to express our entire concurrence with the contents of the following extract from a statement forwarded to the Board by the War Office in a letter dated April 16, 1914:—

"Without an adequate supply of suitable horses in civil life upon which to draw it would be impossible to mobilize the Army as it is now constituted, and if such a supply were non-existent we should be compelled at vast expense to maintain not only establishments constantly at war strength, but adequate reserves as well."

Unfortunately this supply did prove on mobilization to be inadequate for military purposes, and it appears to us, therefore, to be essential to the national welfare that steps should be taken by the Government to deal with the situation, and on comprehensive lines. We are aware that the adoption of our proposals will involve very considerable expenditure—and a progressively increasing one for a few years—but even if it eventually approximates an annual outlay of £100,000, the amount would be small compared with that expended by many Continental Powers, or with the sum that would be required if it were found necessary for the War Office to set up establishments for breeding remounts.

We fully recognize the need for national economy in every possible direction, but in view of the serious condition of the light horse-breeding industry of the country, we are of opinion that it would be false economy to defer taking action on the lines suggested.

The above summary is signed by all the members of the Committee, but Mr. Chaplin makes an additional report, in the course of which he suggests that:—

"Racing being the foundation upon which the light horse-breeding industry rests, in the reconstitution of any existing central authority, or in the creation of any new one in connection with the light horse industry, it would be an advantage if racing was represented upon it by more than one of the members; and it would also be well if British farmers, who comprise the largest number of breeders, should be represented upon it by one of their own class as well."

BOARD OF AGRICULTURE AND FISHERIES.
(Leaflet 304.)

Husk or Hoose in Calves.

Husk or hoose is a parasitic disease of calves caused by the presence of small thread-like worms in the tubes of the lungs.

Life-history.

The life-history of the parasite has not been completely investigated. The eggs and young worms which have been hatched out, are expelled by coughing, and by the bowels after the phlegm from the lungs has been swallowed. The worms live for some time in water or moist soil and probably undergo changes outside the body which enable them to live and develop when they gain access to the system of a calf. It is not known how the parasite reaches the lungs, but possibly the immature forms (eggs and embryos) are swallowed with food or water, and are carried to the lungs by the blood-stream. They develop into adult worms capable of producing young, and so give rise to a fresh crop of young worms. Although the actual cause of the disease is the parasite, external conditions favour its increase. Wet seasons (which favour the preservation of the immature forms), low-lying land, poor condition of the calves, and overstocking, are all favourable to the spread of the disease.

Symptoms.

The symptoms depend to some extent on the degree of infection. The worms cause inflammation of the tubes of the lungs (bronchitis), and this results in a husky cough. Phlegm is coughed up, and in severe cases it may be mixed with blood; it often contains thread-like worms. In severe cases an animal may die suddenly of suffocation. Usually unthriftiness and a cough are the chief symptoms.

Treatment.

The treatment should be both (*a*) preventive and (*b*) medicinal:—

(*a*) If the pastures are very badly contaminated it may be good policy to plough them up and crop the land. Calves should be given a liberal diet and should be kept from pastures

on which infested animals have run, especially if the pastures have been over-stocked or are naturally damp and undrained.

(*b*) It is a popular belief that if volatile drugs, such as turpentine, are given by the mouth, the vapours are given off by the lungs, and exercise a poisonous effect on the parasites. While it is correct that the vapours of such drugs may be excreted by the lungs, the amount so excreted is never sufficient to affect parasites, and therefore treatment of this kind cannot be effective.

The injection of drugs into the windpipe, and fumigation by poisonous gases, give good results, but these methods should only be undertaken with the advice and under the supervision of a veterinary surgeon.

Whitehall Place, London, S.W.,
October, 1915.

CONCLUSIONS ON TUBERCULOSIS IN CATTLE.

(1) REMOVAL of all tubercular cattle showing physical symptoms of any kind will eliminate from 25 to 40 per cent. of the open pulmonary cases.

(2) We believe that a physical examination, combined with an examination of animal secretions (milk, pulmonary secretions, fæces, vaginal secretions), will reveal nearly all the spreaders in a tubercular herd.

(3) A combined physical examination and guinea-pig inoculation of animal secretions add materially to the insurance against the introduction into healthy herds of open cases of tubercular cattle entering with a clean bill of health (tubercular animals that fail to react, or that have been treated to prevent a reaction).

(4) Among the tubercular cattle examined one cow in five was carrying tubercle bacilli in the œsophagus.

(5) Our results emphasize the principles laid down by Professor Bang, that in the suppression of tuberculosis reactors and non-reactors should not be kept together.

(6) Because of the frequency with which tubercular cattle spread tubercle bacilli from the bronchial mucous membranes, and because of the danger from buying such animals into the herd, it is strongly advised that all dairy cows be provided with individual mangers for feeding and watering.—*Report of the New York State Veterinary College.*

Correspondence.

MILK FEVER IN COWS.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—I am obliged for your kindness in publishing my recent communication on the above. With reference to your added comment upon it, with its underlying vein of sarcasm, I will feel doubly grateful if you will kindly insert this letter in your next issue.

In the first place, let me state very clearly that it was in no spirit whatever of adverse criticism that I referred to Mr. Mayall's treatment. No one reads this gentleman's contributions to our professional journals with greater pleasure and interest than myself. My chief aim was simply to recount as briefly as possible what has proved in my experience and practice a highly successful treatment.

I do not think it quite in the best interests of either the profession or our patients to argue that because the injection of sterilized air (an acknowledged specific) can be adopted by "any layman," the more mysterious pot. iodide treatment should be resorted to. Particularly as some practitioners consider the latter harmful in regard to the subsequent secretion in the udder. I may also say that the common remedy given by most country chemists to the layman who comes to them for advice is the very one to which you seem to think the necessary mystery attaches.

As regards the comparative costs of treatments, mine entails but the use of one cardiac tonic given hypodermically, and those cost 1s. 3d. *per dozen*. The violent stage which necessitates the administration of the more expensive chloral and pot. brom. does not occur in one of every twelve cases, therefore scarcely counts in general practice.

You ask, with reference to the teat tapes, "Why not twelve?" instead of, as I said, four hours. Well, simply because from practical experience I have obtained excellent results from four hours. You say I am evidently favoured in having nearly all uncomplicated cases. Might I suggest my treatment in the first instance prevents complications.

In conclusion, I would remark my fulness of description *re* cow's position, &c., is mainly attributable to the fact being impressed upon me frequently by my teachers—that it is always advisable, when dealing with professors or examiners, to give all the information you possess in detail. They might not take it for granted that you did know these minor, but important, details unless you told them so.

So that in laying stress on that, I showed, at the same time, two things I learnt as a pupil.

Yours faithfully,

PATRICK MACCORMACK.

Reviews.

The Principles of Veterinary Surgery. By Louis A. Merillat, V.S., Professor of Veterinary Surgery in the M'Killip Veterinary College, author of "Animal Dentistry and Diseases of the Mouth," late President of the Chicago Veterinary Society. Including an authorized Translation, Enlargement, and Rearrangement of "General Veterinary Surgical Pathology" by Professors C. Cadeac, P. Leblanc, and C. Carrougeau, of the Veterinary High School, Lyons, France. Second edition. Revised and enlarged. Pp. 345, 114 figures in the text. Price 18s. net, postage 6d. Published by Alexander Eger, Chicago, and Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden, London, W.C.

This is the second volume of the veterinary surgery of which Professor Merillat is the author. It has been written to supply the need of a surgical book furnished by and for the veterinarian, and to meet the requirements of the junior student studying the principles upon which sound surgical knowledge is based. It is divided into two main portions, the first consisting of eleven and the second of four chapters (being a translation of the French work "Pathologie Chirurgicale Générale," with enlargements and apt additions by the author). The matter in each individual chapter is well arranged, and the examples of various pathological conditions met with under the title of the respective headings are very comprehensive. Taking *gangrene* as an example, we get a definition of the condition, the cause, numerous examples met with in practice, the pathological anatomy, symptoms, and treatment. Two very valuable contributions are those on asepsis and antisepsis, and traumatisms. The veterinary surgeon who thinks he knows all about the former and considers that he always does his best to practise it may take a fresh view of his method of procedure after reading the author's words on the subject. If he cannot carry out all the indicated technique in general practice, yet he may gain useful hints for improved action. Much up-to-date information is included in the pages of the book on such matters as opsonins, serums, anæsthesia, and osteoporosis.

The restraint of our subjects for operation is an important matter, and the different methods adoptable are fully discussed. Apparently much greater use is made of the operating-table in America than in this country, and those practitioners fortunate enough to possess a table may obtain welcome wrinkles on things to know in connection with its manipulation and the fixing and freeing of the patient.

When dealing with anæsthesia and anæsthetics, the professor writes that "his experience with chloroform in carnivora has been disastrous." The illustration of the inhalation apparatus for dogs on p. 124 appears to us to indicate one of a very primitive type. There are much better ones used by British practitioners

which, we are sure, would be safer and lessen fatalities. We cannot teach Americans much, but we believe we are in advance of them over here as regards canine work. A timely word of warning is given as to the danger of chloroformization following cocaine injections.

Botryomycosis is hardly dealt with fully enough. Surgical interference in general practice is not always practicable, and often unsatisfactory from the owner's point of view, who wants his horse to work again quickly. Together with the internal administration of potassium iodide, we have had excellent results and a quick return of the horse to use by giving at the same time injections into the substance of the tumour of tincture of iodine, blistering its surface with biniodide of mercury ointment, and making a slight incision if necessary. We have many cases of equine botryomycosis to deal with in this country, and a good knowledge of how to treat it successfully is essential to the practitioner.

Rickets in animals is a very interesting malady to many veterinarians. The lines on the subject are well worth reading. In treatment of the defect the uses of bone powder and calcium phosphate are decried, as these substances are not assimilable. Chloro-phosphate of lime is recommended instead.

Our opinion of this book is very favourable. We cannot put forward all its good points in a short review. It is a mine of valuable information in a wide domain. The intellect of the practitioner who consults it will be broadened, deepened, and quickened, and if he reads it intelligently he will be able to understand and explain many of the trifling and important changes he sees in animal lesions and disease, and which hitherto perhaps he has occasionally been unable to account for. As an example, we have often seen slight necrosis in connection with the stitches in a wound. It never struck us until we read it in this book that the condition might arise from the pressure of sutures. The work is excellently bound and printed, and the illustrations in the letterpress are good.

It is not a book to be taken lightly, glanced through, and left, if the best is to be obtained out of it, nor can its contents be quickly assimilated. We can return to it again and again, and find each time some new and verifiable fact of interest. When we have incorporated all the knowledge contained in its pages, we shall indeed be veterinary surgeons fully equipped mentally in this special sphere. G. M.

Animal Castration. By J. V. Lacroix, D.V.S., Professor of Surgery, The Kansas City Veterinary College. Pp. 140, 23 illustrations in the text. Price 7s. 6d., postage 5d. (Chicago: *The American Journal of Veterinary Medicine*. London: Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden).

This is the eighth number of the Veterinary Medicine series, issued with D. M. Campbell, of the *American Journal of Veteri-*

XUM

nary Medicine, as editor. It is a handy, compact, and useful volume, with some good illustrations. It is conveniently divided into two main portions, dealing respectively with the castration of males and of females. The anatomy of the structures involved is described and the methods of castration denoted, and we notice that the use of the wooden clamp is only incidentally mentioned, and is not advocated or described. This is as it should be in an up-to-date book on the subject. The emasculator and the écraseur are the instruments recommended and used by the author in his operations. The emasculations of the horse, bos, sheep, swine, dogs, and cats and birds are described in the first section of the work, and the mare, cow, heifer, sow, bitch, and cat receive attention in the female group. A short appendix deals with equine umbilical hernia and Cæsarean section in the sow. With regard to ovariotomy in the bitch, we think that the flank operation is advantageous in some breeds of dogs, and under certain conditions is safer than the median line incision. It might have been advantageously described and illustrated. If Cæsarean section in the sow is important, then the same operation in the bitch is far more so, and we think it ought not to have been omitted. In castrating lambs, the safe course is to cut off a piece of the end of the purse, as good drainage is of vital importance in this case. Many men know little about the best way to castrate a full-grown ram, and the author does not enlighten them.

Whatever is included in the book is dealt with in a masterful manner. No superfluous verbiage mars the author's descriptions. His instructions and statements of procedure may be relied on. The book is one of the best we have read on the subject, and is a worthy successor to the volumes that have preceded it. Any practitioner who fancies himself as an animal castrator will benefit greatly by reading this little volume. It is up to date and essentially of a practical nature. G. M.

Journal of the American Veterinary Medical Association, formerly the *American Veterinary Review*, November, 1915. Edited by Pierre A. Fish, Ithaca, New York. Issued monthly. Price 3 dollars per annum.

The American Veterinary Medical Association has purchased the *American Veterinary Review*, and with the title of "*The Journal of the American Veterinary Medical Association*" the monthly official organ of the national veterinary body is now appearing under the editorship of Pierre A. Fish, D.V.M. of Ithaca, New York. For about forty years Dr. Liautard, who is now in France, conducted the *Review* with conspicuous tact and ability, and the invaluable pioneer work which he did for veterinary education and literature in the States must ever stand as a monument to his name and fame. As a periodical run by veterinarians for veterinarians, the *Journal of the American Veterinary Association* ought to be assured of a full supply of intellectual and progressive clinical fare, the science of the pro-

fession will doubtless benefit, and a strong and influential instrument arise that will do its duty both in attack and defence. It is only by organization and united action that betterment of the conditions and influence of corporate bodies can be achieved. Politically and scientifically, a powerful press organ can do much for the men whose views, life work, and activities it delineates and espouses. There will be a useful and vigorous life before the new-born literary venture if the members of the Association rally round it and give it all the support in their power. We want, among other desirable things, to show the general public that we are entitled to be considered the equals of any other body of professional men, that we are learned, up to date, expert in our own line, capable of defending our honour and our field of labour, and ever ready to study and advance measures for the welfare of animals in health and disease. A well supported and largely circulated journal is an important factor in the achievement of these things, so we wish the new periodical all success and long life.

This November number of the new-born periodical is full of good things. The contribution on "Sutures and Suturing," a paper read before the American Veterinary Medical Association by J. V. Lacroix, is well written and shows how a simple everyday operation may be rendered interesting and instructive when treated by a master hand. The author thinks that veterinary surgeons ought to give far more consideration to the matter than is usual, and that suppurative and non-immobilized wounds should be much less frequent than they are. In the discussion which followed the tension of sutures, the material used, and the difficulty in the case of the cat were commented on. A paper that may be read with profit by all men interested in veterinary education is that on "The Value and Methods of Teaching the Fundamental Subjects in the Veterinary Curriculum," by H. S. Murphy. Some real live points are put before readers in this paper and the writer has evidently both a knowledge of human nature and of the science of teaching. We think teachers, like poets, are "born not made." The consideration of hog cholera in all its phases has a large share of the letterpress and would-be serum users can pick up many useful hints and learn much information on the matter from what is written. Clinical cases reported are interesting, but, as with us, not too plentiful. "Urinary Lithiasis in Bovines," by J. B. Jones, a paper read before the Association and followed by a discussion, shows how difficult adequate surgical procedure is in such cases and also indirectly invites to further improved procedure as regards the affection. Abstracts and Necrology appear in the issue, and altogether the publication is first class and a credit to all concerned.

G. M.

ARMY VETERINARY SERVICE.

Army Veterinary Corps.

Christian names of temporary Captain Frank Septimus Clay are as now described.

Temporary Lieutenant G. S. Thomas to be temporary Captain; H. L. Somers to be temporary Lieutenant.

Major G. C. O. Fowler, retired pay, to be Major (temporary); Major G. C. O. Fowler to be temporary Lieutenant-Colonel.

Temporary Lieutenants to be temporary Captains: A. J. Sellers, D. O. Turnbull. To be temporary Lieutenants: G. H. Barber, G. W. Davidson.

Lieutenant-Colonels to be temporary Colonels whilst Dep. Directors of Veterinary Services: F. Eassie, D.S.O., G. M. Williams.

Temporary Lieutenants to be temporary Captains: H. S. H. Jones, W. P. Reid, S. E. Hill. A. W. N. Pillers, F.R.C.V.S., to be temporary Lieutenant.

Temporary Lieutenants to be temporary Captains: W. S. Reid, F. G. Rugg, W. D. Connochie. J. MacIlvenna to be temporary Lieutenant.

Captain R. D. Williams takes rank and precedence as Captain in the Army Veterinary Corps, T.F.

To be temporary Lieutenants: J. F. O'Grady, A. W. Allen.

Major (temporary Lieutenant-Colonel) A. England relinquishes temporary rank on alteration in posting. Major (temporary Lieutenant-Colonel) E. J. Lawson relinquishes temporary rank on alteration in posting.

The appointment of Lieutenant J. W. Tait, which was announced in *Gazette* of April 18, is cancelled. J. W. Tait to be Lieutenant (December 2).

W. H. Macfarlane to be Lieutenant.

Temporary Lieutenants to be temporary Captains: W. P. Power, A. Hoskins. C. J. Clifford to be temporary Lieutenant.

Temporary Lieutenant F. S. Clay to be temporary Captain.

Temporary Lieutenant A. Ellison to be temporary Captain.

P. D. Reavy to be temporary Lieutenant.

Temporary Lieutenants to be temporary Captains: H. H. Fetherstonhaugh, G. H. Pollock. Temporary Lieutenant H. S. Jones relinquishes commission on the termination of engagement.

Lieutenant J. P. Heyes to be Captain. J. R. Conchie to be Lieutenant. J. L. Taylor to be Lieutenant.

To be temporary Captains: Temporary Lieutenants G. Barry, T. M. Parker.

The following temporary appointments were made at the War Office:—

Assistant Director-General: Captain J. W. Rainey, Reserve of Officers, from Deputy Assistant Director-General, and to be temporary Major while so employed, vice Major A. G. Todd, A.V.C.

Deputy Assistant Director-General: Captain P. D. Carey, A.V.C., vice temporary Major J. W. Rainey, Reserve of Officers.